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SUBSPECIES AND VARIETY

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IN a recent discussion (RHODORA 43: 157-167. 1941) R. T. Clausen presents a point of view on subspecies and varieties fairly widely held among American botanists, though not much subscribed to elsewhere. Fernald has previously presented an opposite point of view (RHODORA 42: 239-246. 1940).

Clausen invokes a lengthy historical argument, the previous confusion in the use of 'variety,' and the necessity of cooperation with zoology to justify the use of 'subspecies' for "the most important variations under the species", restricting the use of 'variety' to "mere trivial genetic variations" "as the horticulturists do." The supporters of the now defunct American Code of Botanical Nomenclature and H. M. Hall and his followers have previously used the same arguments to arrive at the same conclusions. In Hall's own reasoning there was, however, a subtle difference, which will be brought out later.

Fernald advocates the use of the term subspecies for "a subdivision of an aggregate species, *Gesamtart* or *species collectivus*," and the term *varietas* for geographic variations of ordinary species, with variations which have no separate geographic ranges to be designated as *formae*. How he distinguishes between aggregate and other species is not too clear, except that he says that many botanists, including himself, regard the subspecies within them as deserving the rank of species.

That Fernald's view is at least nearer the correct one, nomenclaturally, may be seen by examining the system of categories set up in the present International Rules. Three, or, if desired, even

more categories beneath the species are provided. The lowest of these three is *forma*. Clausen suggests no provision for more than two categories, and of these the most trivial is 'variety' or '*varietas*.' One is led to wonder what he would suggest as a term for the subdivisions of aggregate species. Clausen makes no mention of aggregate species, though, so perhaps we may assume that his concept of species and that of Fernald (excluding collective species) are essentially similar and that his 'subspecies' is synonymous with Fernald's '*varietas*' and his 'variety' is synonymous with Fernald's '*forma*.' This is, however, hard to reconcile with his statement on p. 166, "On the other hand, some of the species of the older botanists are only subspecies, since large series today demonstrate intergradation." What a slaughter this point of view would create among the species of *Rubus*, *Aster*, *Pinus*, *Quercus* and other genera where the specific lines are notoriously indistinct! Also, what of those otherwise perfectly distinct species which form hybrid swarms where they meet?

Clausen mentions H. M. Hall as favoring the use of the term 'subspecies' for the primary divisions of species as though this were in support of his own argument. Actually Hall's usage better supports Fernald's concept of subspecies as subdivisions of aggregate species. Certainly most of Hall's subspecies are or have been regarded as species by some other botanists, and many of his species would be admitted by any botanist to be 'aggregate species.' All of the lesser variations, including many so-called 'species' he threw into an unclassified category of "minor variations and synonyms."

The continued appeal to historical precedent may be interesting, but seems to me to have very little point in this connection on either side. Modern taxonomy is based on so much more information than was available to Linnaeus and the other older workers that their concepts can have but slight significance in the determination of the application of the present day nomenclatural equivalents of these concepts. Faced with the necessity for a simple method of expressing an infinitely complex situation, botanists have agreed upon a hierarchy of categories. To simplify the application of names, the designations of these categories were made to agree as far as possible with those used

by the pre-evolutionary botanists. Any attempt to attach further significance than this to the historical background merely adds to the lamentable state of confusion which bothers so many of the writers on this subject.

If previous confusion is of significance in determining present use of categories, then certainly 'family,' 'genus,' and 'species' should be the ones to be thrown out, as they have been the subject of more confusion than has ever surrounded any intraspecific category. And if cooperation with, or imitation of zoologists is to be a deciding factor, certainly one of the first necessities is to eliminate the multitude of generic homonyms in the combined system, and another is to induce one or the other group to bring the suffixes for its higher categories into conformity with those of the other. Of course, none of these changes would likely be seriously recommended by anyone.

The solution seems actually simple enough, if one recognizes that there are many types of evolutionary process in operation, producing many kinds of species, and that intraspecific units may be incipient species in various stages of development. These stages may be at least roughly indicated by the categories in which the groups are placed. Each taxonomist may take the system of categories set up in the International Rules and apply it to the groups of plants with which he is working in the way that, in his judgment, best expresses the relationships of the groups of individuals concerned. The Rules require only that the order of the categories be not disturbed, and that each plant be placed in a species, genus, family, order, class, division and kingdom. All other categories are to be used at the discretion of the worker. In this way the system will retain the flexibility that is absolutely essential to make it fit the wide variety of evolutionary situations to which it must apply. Discarding of any of the categories, whether from reasons of historical confusion or personal prejudice, impairs this flexibility.

Since the above was written my friend Joseph Ewan, in a recent discussion (*Bull. Torr. Bot. Cl.* **69**: 138-149. 1942), recommends "the use of the term subspecies to replace the more inexact and variously used term variety," and at the same time deplors the practice of making new combinations for names originally proposed in one of these categories when they are

transferred to the other. Apparently to be consistent with this, in spite of his immediately previous statement that he remains "confident of the enduring value of the use of the term subspecies" and the implication that he will use it in place of variety, on p. 141 he uses *D. hanseni* var. *arcuatum* Greene, and on p. 143 *D. hanseni* var. *kernense* Davidson, but on p. 147, *D. patens* subsp. *montanum* (Munz) Ewan for an apparently coordinate subdivision. In the discussion, on p. 139, however, he says, "To obviate this persistent confusion, . . . it seems to me desirable to adopt the straight trinomial when referring to the rank below that of the species." On p. 140, in a footnote, he says, "It is the author's express intent to avoid *formal* establishment of any name for *typical* subspecies, i. e., '*D. hanseni hanseni* nomen nov.', but to indicate by such usage that the typical phase of the species is intended. Technically such trinomials should be credited to Greene; . . ." On page 141 he uses *D. hanseni hanseni*, referring to it as a subspecies. One could not wish for a better example of the way in which the "persistent confusion, which cannot but reflect discredit upon systematic botany" is compounded. It is perfectly obvious that a non-systematic botanist could not possibly follow what Mr. Ewan is talking about, and equally obvious that he has not studied very carefully Articles 12 and 13 of the International Rules for Botanical Nomenclature. Such ambiguity has run almost universally through the writings of those who have recommended the use of the term *subspecies* in place of *varietas*, and yet their principal argument is the confused and inexact application of the term variety. In the light of Articles 12 and 13 it is perfectly plain that a transfer from one to the other of these categories must be accompanied by a change in authority and that the straight trinomial is completely meaningless. In the light of plain common sense it is obvious that if a name is used in print, i. e., *Delphinium hanseni hanseni*, it is published, and that Greene cannot be the author of the trinomial. Its author is Ewan. Greene was dead long before this trinomial was thought of.

It might be added that, in spite of Ewan's statement on page 139, lines 16-19, the practice of repeating the specific epithet for the designation of the typical subspecific unit has been followed in America by Dr. Rogers McVaugh (Mem. Torr. Bot.

Cl. 19 (4): 23, 27, 51. 1941; Am. Midl. Nat. 24: 687, 695, 697, 1940; Ann. Mo. Bot. Gard. 27: 347-349. 1940) and by myself in a number of as yet unpublished papers and in at least two published ones (Am. Midl. Nat. 26: 69. 1941; Lloydia 4: 275. 1941). Dr. Gleason has told me that he has definitely published the proposal, for action at the next Botanical Congress, that this method be made mandatory. The last example by McVaugh, cited above, is also an excellent example of a place where the use of both categories, *subspecies* and *varietas*, is desirable within the same species.

Finally, concerning the confusion surrounding the term 'variety,' most of those who dwell upon this confusion seem to overlook the fact that the confusion is about the term 'variety' while the category in the Rules is '*varietas*.' Botanically there has been relatively little confusion of the meaning of the Latin term. If one is worried by the confusion surrounding the English translation of this word, he should look up the English translations of the words '*genus*' and '*species*' in a good Latin-English dictionary (i. e. Cassell's) and see what confusion emerges. All three terms were good Latin words long before they were adopted by botanists, and had their popular meanings and attendant confusions. It seems to serve no good purpose to disturb legitimate botanical usage by recourse to arguments based on popular, horticultural, or even past botanical confusion.

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SUBSPECIES

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DR. FOSBERG hardly needs support; yet the following rather desultory remarks, to be regarded as in the nature of footnotes, may perhaps usefully supplement his excellent discussion.

He is, of course, right in maintaining that present usage is of more importance than past; yet something may be learned from history, if only that arguments drawn from it may be worthless. In looking over the three preceding articles, I have been struck by the fact that Clausen places his chief emphasis on definitions,